

ART 34 PCT

10/534718
JC06 Rec'd PCT/PTO 12 MAY 2005

WO 2004/044049

PCT/US2003/036696

AMENDED CLAIMS

[received by the International Bureau on 01 September 2004 (01.09.2004);
original claims 1-89 replaced by new claims 1-98 (26 pages)]

The claims are:

- 1 1. A plastic resin blend comprising an intumescent flame retardant and at least
2 one plastic resin, wherein the intumescent flame retardant comprises a char forming catalyst
3 and a blowing agent.
- 1 2. The plastic resin blend of claim 1, wherein the at least one plastic resin is a
2 polyolefin.
- 1 3. The plastic resin blend of claim 2, wherein the polyolefin is selected from the
2 group consisting of:
3 (a) polypropylene homopolymer;
4 (b) polypropylene copolymer;
5 (c) ethylene propylene diene monomer (EPDM);
6 (d) maleated propylene diene monomer (m-EPDM);
7 (e) ethylene-polypropylene copolymer;
8 (f) maleated ethylene-polypropylene copolymer (m-EP copolymers);
9 (g) a thermoplastic elastomer;
10 (h) a thermoplastic rubber;
11 (i) ethylene/vinyl acetate copolymer (EVA)
12 (j) a poly(4-methyl-1-pentene) homopolymer;
13 (k) poly(4-methyl-1-pentene/1-decene) copolymer;
14 (l) very low density polyethylene (VLDPE);
15 (m) low density polyethylene (LDPE);
16 (n) medium density polyethylene (MDPE);

- 19 (q) crosslinked polyethylene (XLPE);
20 (r) crosslinked polypropylene (XLPP); and
21 (s) blends of any of the components (a) through (r).

1 4. The plastic resin blend of claim 3, wherein the polyolefin comprises
2 approximately 10 to 85 percent by weight of the plastic resin blend.

1 5. The plastic resin blend of claim 4, wherein the polyolefin comprises
2 approximately 50 to 75 percent by weight of the plastic resin blend.

1 6. The plastic resin blend of claim 3, wherein the polyolefin is polypropylene,
2 polyethylene, or a blend thereof, and the polyolefin comprises approximately 51 percent by
3 weight of the plastic resin when used in combination with a second polyolefin.

1 7. The plastic resin blend of claim 1, wherein the plastic resin is polyurethane or
2 polyurea.

1 8. The plastic resin blend of claim 1, wherein the intumescent flame retardant is
2 selected from the group consisting of:

- 3 (a) activated melamine pyrophosphate;
4 (b) activated melamine polyphosphate;
5 (c) activated ethylene diamine phosphate;
6 (d) activated ammonium polyphosphate;
7 (e) blends of any of the components (a) through (d).

1 9. The plastic resin blend of claim 8, wherein the intumescent flame retardant is a
2 blend of activated ethylene diamine phosphate and melamine phosphate.

- 1 10. The plastic resin blend of claim 1, wherein the intumescent flame retardant
2 comprises approximately 10 to 50 percent by weight of the plastic resin blend.
- 1 11. The plastic resin blend of claim 10, wherein the intumescent flame retardant
2 comprises approximately 25 to 35 percent by weight of the plastic resin blend.
- 1 12. The plastic resin blend of claim 11, wherein the intumescent flame retardant
2 comprises approximately 33 percent by weight of the plastic resin blend for cable
3 applications.
- 1 13. The plastic resin blend of claim 10, wherein the intumescent flame retardant
2 comprises approximately 10 to 25 percent by weight of the plastic resin blend for injection
3 molding applications.
- 1 14. The plastic resin blend of claim 1, wherein the plastic resin blend is a
2 concentrate.
- 1 15. The plastic resin blend of claim 14, wherein the intumescent flame retardant
2 comprises approximately 30 to 95 percent by weight of the plastic resin blend.
- 1 16. The plastic resin blend of claim 1, further comprising at least one engineering
2 resin.
- 1 17. The plastic resin blend of claim 16, wherein the at least one engineering resin
2 is selected from the group consisting of:
3 (a) nylon;
4 (b) poly(butylene terephthalate);
5 (c) poly(ethylene terephthalate);
6 (d) acrylonitrile butadiene styrene (ABS);

- 7 (e) nylon 6;
- 8 (f) nylon 6/6;
- 9 (g) nylon 11;
- 10 (h) nylon 12;
- 11 (i) polycarbonate;
- 12 (j) aromatic polyamide; and
- 13 (k) blends of any of the components (a) through (j).

1 18. The plastic resin blend of claim 16, wherein the at least one engineering resin
2 comprises a blend of ABS/polycarbonate.

1 19. The plastic resin blend of claim 1, further comprising at least one additive.

1 20. The plastic resin blend of claim 19, wherein the additive is selected from the
2 group consisting of:

- 3 (a) hindered phenolic stabilizer;
- 4 (b) acid scavenger;
- 5 (c) acid hydrotalcite;
- 6 (d) endothermic agent;
- 7 (e) UV absorber;
- 8 (f) nanoclay;
- 9 (g) nanomaterial;
- 10 (h) filler;
- 11 (i) fiberglass;
- 12 (j) metallic filler;
- 13 (k) colorant; and
- 14 (l) blends of any of the components (a) through (k).

1 21. The plastic resin blend of claim 19, wherein the additive comprises up to
2 approximately 75 percent of the plastic resin blend based on polymer components plus the
3 additive.

1 22. The plastic resin blend of claim 21, wherein the additive comprises
2 approximately 0 to 60 weight percent of the engineering resin blend based on polymer
3 components plus the additive.

1 23. The plastic resin blend of claim 22, wherein the additive comprises
2 approximately 0 to 40 weight percent of the engineering resin blend based on polymer
3 components plus the additive.

1 24. The plastic resin blend of claim 1, further comprising a thermoset resin.

1 25. The plastic resin blend of claim 24, wherein the thermoset resin is selected
2 from the group consisting of:

- 3 (a) polyester;
- 4 (b) polyolefin;
- 5 (c) epoxy;
- 6 (d) vinyl ester;
- 7 (e) alkyl polyester;
- 8 (f) melamine isocyanurate;
- 9 (g) polyurethane;
- 10 (h) polyurea;
- 11 (i) phenolic resin;
- 12 (j) phenylene-based resin;
- 13 (k) isophthalic unsaturated polyester;
- 14 (l) orthophthalic unsaturated polyester; and

15 (m) blends of any of the components (a) through (l).

1 26. The plastic resin blend of claim 25, wherein the polyurethane is a
2 polyurethane foam.

1 27. An engineering resin blend comprising an intumescent flame retardant and at
2 least one engineering resin, wherein the intumescent flame retardant comprises a char
3 forming catalyst and a blowing agent.

1 28. The engineering resin blend of claim 27, wherein the at least one engineering
2 resin is selected from the group consisting of:

- 3 (a) nylon;
- 4 (b) poly(butylene terephthalate);
- 5 (c) poly(ethylene terephthalate);
- 6 (d) acrylonitrile butadiene styrene (ABS);
- 7 (e) nylon 6;
- 8 (f) nylon 6/6;
- 9 (g) nylon 11;
- 10 (h) nylon 12;
- 11 (i) polycarbonate;
- 12 (j) aromatic polyamide; and
- 13 (k) blends of any of the components (a) through (j).

1 29. The engineering resin blend of claim 27, wherein the intumescent flame
2 retardant is selected from the group consisting of:

- 3 (a) activated melamine pyrophosphate;
- 4 (b) activated melamine polyphosphate;
- 5 (c) activated ethylene diamine phosphate;

- 6 (d) activated ammonium polyphosphate; and
7 (e) blends of any of the components (a) through (d).

1 30. The engineering resin blend of claim 27, further comprising at least one plastic
2 resin.

1 31. The engineering resin blend of claim 30, wherein the at least one plastic resin
2 is a polyolefin.

1 32. The engineering resin blend of claim 31, wherein the polyolefin is selected
2 from the group consisting of:

- 3 (a) polypropylene homopolymer;
4 (b) polypropylene copolymer;
5 (c) ethylene propylene diene monomer (EPDM);
6 (d) maleated propylene diene monomer (m-EPDM);
7 (e) ethylene-polypropylene copolymer;
8 (f) maleated ethylene-polypropylene copolymer (m-EP copolymers);
9 (g) a thermoplastic elastomer;
10 (h) a thermoplastic rubber;
11 (i) ethylene/vinyl acetate copolymer (EVA)
12 (j) a poly(4-methyl-1-pentene) homopolymer;
13 (k) poly(4-methyl-1-pentene/1-decene) copolymer;
14 (l) very low density polyethylene (VLDPE);
15 (m) low density polyethylene (LDPE);
16 (n) medium density polyethylene (MDPE);
17 (o) high density polyethylene (HDPE);
18 (p) linear low density polyethylene (LLDPE);

- 19 (q) crosslinked polyethylene (XLPE);
20 (r) crosslinked polypropylene (XLPP); and
21 (s) blends of any of the components (a) through (r).

1 33. The engineering resin blend of claim 31, wherein the polyolefin comprises
2 approximately 10 to 85 percent by weight of the engineering resin blend.

1 34. The engineering resin blend of claim 33, wherein the polyolefin comprises
2 approximately 50 to 75 percent by weight of the engineering resin blend.

1 35. The engineering resin blend of claim 29, wherein the intumescent flame
2 retardant is a blend of activated ethylene diamine phosphate and melamine phosphate.

1 36. The engineering resin blend of claim 27, wherein the intumescent flame
2 retardant comprises approximately 10 to 50 percent by weight of the engineering resin blend.

1 37. The engineering resin blend of claim 36, wherein the intumescent flame
2 retardant comprises approximately 25 to 35 percent by weight of the engineering resin blend.

1 38. The engineering resin blend of claim 37, wherein the intumescent flame
2 retardant comprises approximately 33 percent by weight of the engineering resin blend for
3 cable applications.

1 39. The engineering resin blend of claim 36, wherein the intumescent flame
2 retardant comprises approximately 10 to 25 percent by weight of the engineering resin blend
3 for injection molding applications.

1 40. The engineering resin blend of claim 27, wherein the engineering resin blend
2 is a concentrate.

1 41. The engineering resin blend of claim 40, wherein the intumescent flame
2 retardant comprises approximately 30 to 95 percent by weight of the engineering resin blend.

1 42. The engineering resin blend of claim 27, wherein the at least one engineering
2 resin is a blend of ABS/polycarbonate.

1 43. The engineering resin blend of claim 27, further comprising at least one
2 additive.

1 44. The engineering resin blend of claim 43, wherein the additive is selected from
2 the group consisting of:

3 (a) hindered phenolic stabilizer;

4 (b) acid scavenger;

5 (c) acid hydrotalcite;

6 (d) endothermic agent;

7 (e) UV absorber;

8 (f) nanoclay;

9 (g) nanomaterial;

10 (h) filler;

11 (i) fiberglass;

12 (j) metallic filler;

13 (k) colorant; and

14 (l) blends of any of the components (a) through (k).

1 45. The engineering resin blend of claim 43, wherein the additive comprises up to
2 approximately 75 percent of the engineering resin blend based on polymer components plus
3 the additive.

1 46. The engineering resin blend of claim 45, wherein the additive comprises
2 approximately 0 to 60 weight percent of the engineering resin blend based on polymer
3 components plus the additive.

1 47. The engineering resin blend of claim 46, wherein the additive comprises
2 approximately 0 to 40 weight percent of the engineering resin blend based on polymer
3 components plus the additive.

1 48. The engineering resin blend of claim 27, further comprising a thermoset resin.

1 49. The engineering resin blend of claim 48, wherein the thermoset resin is
2 selected from the group consisting of:

- 3 (a) polyester;
- 4 (b) polyolefin;
- 5 (c) epoxy;
- 6 (d) vinyl ester;
- 7 (e) alkyl polyester;
- 8 (f) melamine isocyanurate;
- 9 (g) polyurethane;
- 10 (h) polyurea;
- 11 (i) phenolic resin;
- 12 (j) phenylene-based resin;
- 13 (k) isophthalic unsaturated polyester;
- 14 (l) orthophthalic unsaturated polyester; and
- 15 (m) blends of any of the components (a) through (l).

1 50. The engineering resin blend of claim 49, wherein the polyurethane is a
2 polyurethane foam.

1 51. A plastic resin blend comprising an intumescent flame retardant and at least
2 one polyolefin,

3 wherein the intumescent flame retardant is selected from the group consisting of:

- 4 (a) activated melamine pyrophosphate;
5 (b) activated melamine polyphosphate;
6 (c) activated ethylene diamine phosphate;
7 (d) activated ammonium polyphosphate; and
8 (e) blends of any of the components of (a) through (d),

9 wherein the polyolefin is selected from the group consisting of:

- 10 (a) polypropylene homopolymer;
11 (b) polypropylene copolymer;
12 (c) ethylene propylene diene monomer (EPDM);
13 (d) maleated propylene diene monomer (m-EPDM);
14 (e) ethylene-polypropylene copolymer;
15 (f) maleated ethylene-polypropylene copolymer (m-EP copolymers);
16 (g) a thermoplastic elastomer;
17 (h) a thermoplastic rubber;
18 (i) ethylene/vinyl acetate copolymer (EVA)
19 (j) a poly(4-methyl-1-pentene) homopolymer;
20 (k) poly(4-methyl-1-pentene/1-decene) copolymer;
21 (l) very low density polyethylene (VLDPE);
22 (m) low density polyethylene (LDPE);
23 (n) medium density polyethylene (MDPE);
24 (o) high density polyethylene (HDPE);
25 (p) linear low density polyethylene (LLDPE);

- 26 (q) crosslinked polyethylene (XLPE);
27 (r) crosslinked polypropylene (XLPP); and
28 (s) blends of any of the components (a) through (r).

1 52. An engineering resin blend comprising an intumescent flame retardant and at
2 least one engineering resin,

3 wherein the intumescent flame retardant is selected from the group consisting of:

- 4 (a) activated melamine pyrophosphate;
5 (b) activated melamine polyphosphate;
6 (c) activated ethylene diamine phosphate;
7 (d) activated ammonium polyphosphate; and
8 (e) blends of any of the components (a) through (d),

9 wherein the at least one engineering resin is selected from the group consisting of:

- 10 (a) nylon;
11 (b) poly(butylene terephthalate);
12 (c) poly(ethylene terephthalate);
13 (d) acrylonitrile butadiene styrene (ABS);
14 (e) nylon 6;
15 (f) nylon 6/6;
16 (g) nylon 11;
17 (h) nylon 12;
18 (i) polycarbonate;
19 (j) aromatic polyamide; and
20 (k) blends of any of the components (a) through (j).

1 53. A thermoset resin blend comprising an intumescent flame retardant and at least
2 one thermoset, wherein the intumescent flame retardant comprises a char forming catalyst
3 and a blowing agent.

1 54. The thermoset resin blend of claim 53, wherein the thermoset resin is selected
2 from the group consisting of:
3 (a) polyester;
4 (b) polyolefin;
5 (c) epoxy;
6 (d) vinyl ester;
7 (e) alkyl polyester;
8 (f) melamine isocyanurate;
9 (g) polyurethane;
10 (h) polyurea;
11 (i) phenolic resin;
12 (j) phenylene-based resin;
13 (k) isophthalic unsaturated polyester;
14 (l) orthophthalic unsaturated polyester; and
15 (m) blends of any of the components (a) through (l).

1 55. The thermoset resin blend of claim 54, wherein the polyurethane is a
2 polyurethane foam.

1 56. The thermoset resin blend of claim 53, wherein the intumescent flame
2 retardant is selected from the group consisting of:
3 (a) activated melamine pyrophosphate;
4 (b) activated melamine polyphosphate;

- 5 (c) activated ethylene diamine phosphate;
6 (d) activated ammonium polyphosphate; and
7 (e) blends of any of the components (a) through (d).

1 57. The thermoset resin blend of claim 53, wherein the intumescent flame
2 retardant comprises a blend of activated ethylene diamine phosphate and melamine
3 phosphate.

1 58. The thermoset resin blend of claim 53, wherein the intumescent flame
2 retardant comprises approximately 0 to 50 percent by weight of the thermoset resin blend.

1 59. The thermoset resin blend of claim 58, wherein the intumescent flame
2 retardant comprises approximately 5 to 25 percent by weight of the thermoset resin blend.

1 60. The thermoset resin blend of claim 59, wherein the intumescent flame
2 retardant comprises approximately 15 to 20 percent by weight of the thermoset resin blend.

1 61. The thermoset resin blend of claim 53, wherein the thermoset resin blend is a
2 concentrate.

1 62. The thermoset resin blend of claim 61, wherein the intumescent flame
2 retardant comprises approximately 30 to 95 percent by weight of the thermoset resin blend.

1 63. The thermoset resin blend of claim 53, further comprising at least one
2 engineering resin.

1 64. The thermoset resin blend of claim 63, wherein the at least one engineering
2 resin is selected from the group consisting of:

- 3 (a) nylon;
4 (b) poly(butylene terephthalate);

- 5 (c) poly(ethylene terephthalate);
- 6 (d) acrylonitrile butadiene styrene (ABS);
- 7 (e) nylon 6;
- 8 (f) nylon 6/6;
- 9 (g) nylon 11;
- 10 (h) nylon 12;
- 11 (i) polycarbonate;
- 12 (j) aromatic polyamide; and
- 13 (k) blends of any of the components (a) through (j).

1 65. The thermoset resin blend of claim 64, wherein the at least one engineering
2 resin is a blend of ABS/polycarbonate.

1 66. The thermoset resin blend of claim 53, further comprising at least one
2 additive.

1 67. The thermoset resin blend of claim 66, wherein the additive is selected from
2 the group consisting of:

- 3 (a) hindered phenolic stabilizer;
- 4 (b) acid scavenger;
- 5 (c) acid hydrotalcite;
- 6 (d) endothermic agent;
- 7 (e) UV absorber;
- 8 (f) nanoclay;
- 9 (g) nanomaterial;
- 10 (h) filler;
- 11 (i) fiberglass;

- 12 (j) metallic filler;
- 13 (k) curing agent;
- 14 (l) blowing agent;
- 15 (m) heat stabilizer;
- 16 (n) light stabilizer;
- 17 (o) plasticizer;
- 18 (p) accelerator;
- 19 (q) pigment;
- 20 (r) preservative;
- 21 (s) ultraviolet light stabilizer;
- 22 (t) colorant;
- 23 (u) antioxidant;
- 24 (v) antistatic agent;
- 25 (w) viscosity modifier;
- 26 (x) glass fiber; and
- 27 (y) blends of any of the components (a) through (x).

1 68. The thermoset resin blend of claim 66, wherein the additive comprises up to
2 approximately 75 weight percent of the thermoset resin blend based on polymer components
3 plus the additive.

1 69. The thermoset resin blend of claim 66, wherein the additive is glass fiber and
2 comprises up to approximately 60 weight percent of the thermoset resin blend based on
3 polymer components plus the additive.

1 70. The thermoset resin blend of claim 53, further comprising at least one plastic
2 resin.

1 71. The thermoset resin blend of claim 70, wherein the at least one plastic resin is
2 a polyolefin.

1 72. The thermoset resin blend of claim 71, wherein the polyolefin is selected from
2 the group consisting of:

- 3 (a) polypropylene homopolymer;
- 4 (b) polypropylene copolymer;
- 5 (c) ethylene propylene diene monomer (EPDM);
- 6 (d) maleated propylene diene monomer (m-EPDM);
- 7 (e) ethylene-polypropylene copolymer;
- 8 (f) maleated ethylene-polypropylene copolymer (m-EP copolymers);
- 9 (g) a thermoplastic elastomer;
- 10 (h) a thermoplastic rubber;
- 11 (i) ethylene/vinyl acetate copolymer (EVA)
- 12 (j) a poly(4-methyl-1-pentene) homopolymer;
- 13 (k) poly(4-methyl-1-pentene/1-decene) copolymer;
- 14 (l) very low density polyethylene (VLDPE);
- 15 (m) low density polyethylene (LDPE);
- 16 (n) medium density polyethylene (MDPE);
- 17 (o) high density polyethylene (HDPE);
- 18 (p) linear low density polyethylene (LLDPE);
- 19 (q) crosslinked polyethylene (XLPE);
- 20 (r) crosslinked polypropylene (XLPP); and
- 21 (s) blends of any of the components (a) through (r).

1 73. A thermoset resin blend comprising an intumescent flame retardant and at
2 least one thermoset resin,

3 wherein the intumescent flame retardant is selected from the group consisting of:

- 4 (a) activated melamine pyrophosphate;
- 5 (b) activated melamine polyphosphate;
- 6 (c) activated ethylene diamine phosphate;
- 7 (d) activated ammonium polyphosphate; and
- 8 (e) blends of any of the components (a) through (d),

9 wherein the at least one thermoset resin is selected from the group consisting of:

- 10 (a) polyester;
- 11 (b) polyolefin;
- 12 (c) epoxy;
- 13 (d) vinyl ester;
- 14 (e) alkyl polyester;
- 15 (f) melamine isocyanurate;
- 16 (g) polyurethane;
- 17 (h) polyurea;
- 18 (i) phenolic resin;
- 19 (j) phenylene-based resin;
- 20 (k) isophthalic unsaturated polyester;
- 21 (l) orthophthalic unsaturated polyester; and
- 22 (m) blends of any of the components (a) through (l).

1 74. A chemical resin blend comprising an intumescent flame retardant and at least
2 one resin selected from the group consisting of a plastic resin, an engineering resin and a

3 thermoset resin, wherein the intumescent flame retardant comprises a char forming catalyst
4 and a blowing agent.

1 75. The chemical resin blend of claim 74, wherein the resin is a plastic resin.

1 76. The chemical resin blend of claim 74, wherein the resin is an engineering
2 resin.

1 77. The chemical resin blend of claim 74, wherein the resin is a thermoset resin.

1 78. The chemical resin blend of claim 74, wherein the intumescent flame retardant
2 is selected from the group consisting of:

- 3 (a) activated melamine pyrophosphate;
- 4 (b) activated melamine polyphosphate;
- 5 (c) activated ethylene diamine phosphate;
- 6 (d) activated ammonium polyphosphate; and
- 7 (e) blends of any of the components (a) through (d).

1 79. A cable comprising an intumescent flame retardant and at least one resin
2 selected from the group consisting of a plastic resin, an engineering resin and a thermoset
3 resin, wherein the intumescent flame retardant comprises a char forming catalyst and a
4 blowing agent.

1 80. The cable of claim 79, wherein the cable is selected from the group consisting
2 of plenum cable, fiber optic cable, copper cable, telecommunications cable, and video cable.

1 81. The cable of claim 80, wherein the resin is a plastic resin.

1 82. The cable of claim 80, wherein the resin is an engineering resin.

83. The cable of claim 80, wherein the resin is a thermoset resin.

84. The cable of claim 80, wherein the intumescent flame retardant is selected from the group consisting of:

- (a) activated melamine pyrophosphate;
- (b) activated melamine polyphosphate;
- (c) activated ethylene diamine phosphate;
- (d) activated ammonium polyphosphate; and
- (e) blends of any of the components (a) through (d).

85. A pellet comprising an intumescent flame retardant and at least one resin selected from the group consisting of a plastic resin, an engineering resin and a thermoset resin, wherein the intumescent flame retardant comprises a char forming catalyst and a blowing agent.

86. The pellet of claim 85, wherein the resin is a plastic resin.

87. The pellet of claim 85, wherein the resin is an engineering resin.

88. The pellet of claim 85, wherein the resin is a thermoset resin.

89. The pellet of claim 85, wherein the intumescent flame retardant is selected from the group consisting of:

- (a) activated melamine pyrophosphate;
- (b) activated melamine polyphosphate;
- (c) activated ethylene diamine phosphate;
- (d) activated ammonium polyphosphate; and
- (e) blends of any of the components (a) through (d).

90. The plastic resin blend of claim 1, wherein the intumescent flame retardant further comprises at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f).

91. The engineering resin blend of claim 27, wherein the intumescent flame retardant further comprises at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f).

92. The thermoset resin blend of claim 53, wherein the intumescent flame retardant further comprises at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;

- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f).

93. The chemical resin blend of claim 74, wherein the intumescent flame retardant further comprises at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f).

94. A plastic resin blend comprising an intumescent flame retardant and at least one polyolefin,

wherein the intumescent flame comprises a char forming catalyst, a blowing agent and at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (e) melamine cyanurate; and

(f) blends of any of the components of (a) through (e),

wherein the polyolefin is selected from the group consisting of:

- (a) polypropylene homopolymer;
- (b) polypropylene copolymer;
- (c) ethylene propylene diene monomer (EPDM);
- (d) maleated propylene diene monomer (m-EPDM);
- (e) ethylene-polypropylene copolymer;
- (f) maleated ethylene-polypropylene copolymer (m-EP copolymers);
- (g) a thermoplastic elastomer;
- (h) a thermoplastic rubber;
- (i) ethylene/vinyl acetate copolymer (EVA)
- (j) a poly(4-methyl-1-pentene) homopolymer;
- (k) poly(4-methyl-1-pentene/1-decene) copolymer;
- (l) very low density polyethylene (VLDPE);
- (m) low density polyethylene (LDPE);
- (n) medium density polyethylene (MDPE);
- (o) high density polyethylene (HDPE);
- (p) linear low density polyethylene (LLDPE);
- (q) crosslinked polyethylene (XLPE);
- (r) crosslinked polypropylene (XLPP); and
- (s) blends of any of the components (a) through (r).

95. An engineering resin blend comprising an intumescent flame retardant and at least one engineering resin,

wherein the intumescent flame retardant comprises a char forming catalyst, a blowing agent and at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f),

wherein the at least one engineering resin is selected from the group consisting of:

- (a) nylon;
- (b) poly(butylene terephthalate);
- (c) poly(ethylene terephthalate);
- (d) acrylonitrile butadiene styrene (ABS);
- (e) nylon 6;
- (f) nylon 6/6;
- (g) nylon 11;
- (h) nylon 12;
- (i) polycarbonate;
- (j) aromatic polyamide; and
- (k) blends of any of the components (a) through (j).

96. A thermoset resin blend comprising an intumescent flame retardant and at least one thermoset resin,

wherein the intumescent flame retardant comprises a char forming catalyst, a blowing agent and at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f),

wherein the at least one thermoset resin is selected from the group consisting of:

- (a) polyester;
- (b) polyolefin;
- (c) epoxy;
- (d) vinyl ester;
- (e) alkyl polyester;
- (f) melamine isocyanurate;
- (g) polyurethane;
- (h) polyurea;
- (i) phenolic resin;
- (j) phenylene-based resin;
- (k) isophthalic unsaturated polyester;
- (l) orthophthalic unsaturated polyester; and
- (m) blends of any of the components (a) through (l).

97. The cable of claim 80, wherein the intumescent flame retardant further comprises at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f).

98. The pellet of claim 85, wherein the intumescent flame retardant further comprises at least one component selected from the group consisting of:

- (a) melamine;
- (b) melamine phosphate;
- (c) unactivated melamine pyrophosphate;
- (d) unactivated melamine polyphosphate;
- (e) unactivated ammonium polyphosphate;
- (f) melamine cyanurate; and
- (g) blends of any of the components (a) through (f).